

WHAT IS CLAIMED IS:

1. An ultrasonic clamp coagulator apparatus comprising:
a housing, said housing comprising an actuator;
5 an outer tube having a proximal end joined to said housing, and
a distal end, said outer tube defining a longitudinal axis;
an actuating element reciprocally positioned within said outer tube, said actuating
element operatively connected to said actuator;
an ultrasonic waveguide positioned within said outer tube, said ultrasonic
10 waveguide having an end-effector extending distally from said distal end of
said outer tube,
wherein said end-effector comprises a broad edge and a narrow
edge, wherein said narrow edge is defined by the intersection of a
first surface and a second surface, wherein said first surface extends
15 proximally into said end-effector defining a length of said first
surface; and
a clamp arm pivotally mounted on said distal end of said outer tube for pivotal
movement with respect to said end-effector for clamping tissue between
said clamp arm and said end-effector, said pivotal movement occurring
20 about a horizontal axis, the arc of said pivotal movement of said clamp arm
defining a vertical plane, said vertical plane having a vertical axis
orthogonal to both said longitudinal axis and said horizontal axis, said
clamp arm operatively connected to said actuating element so that
reciprocal movement of said actuating element pivots said clamp arm along
25 said vertical plane;
wherein said length of said first surface balances said waveguide such that
excursion of said waveguide is minimized in said vertical plane.
2. An ultrasonic clamp coagulator apparatus according to claim 1, wherein
30 excursion of said end-effector along said vertical axis is limited to less than 15 %.
3. An ultrasonic clamp coagulator apparatus according to claim 1, wherein
excursion of said end-effector along said vertical axis is limited to less than 10 %.

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4. An ultrasonic clamp coagulator apparatus according to claim 1, wherein excursion of said end-effector along said vertical axis is limited to less than 5 %.

5 5. A blade for an ultrasonic surgical instrument comprising:
a proximal end;
a distal end;
a broad edge; and
a narrow edge, wherein said narrow edge is defined by the intersection of a first
10 surface and a second surface, wherein said first surface extends proximally into
said blade from said distal end toward said proximal end, defining a length of said
first surface;

wherein said length of said first surface balances said blade such
that a secondary tip excursion of said blade is less than 15 % of the
15 primary tip excursion of said blade.

6. An ultrasonic surgical instrument according to claim 5, wherein a
secondary tip excursion of said blade is less than 10 % of the primary tip
excursion of said blade.

20 7. An ultrasonic surgical instrument according to claim 5, wherein a
secondary tip excursion of said blade is less than 5 % of the primary tip excursion
of said blade.

25 8. An ultrasonic surgical instrument according to claim 5, wherein said first
surface is concave.

9. An ultrasonic surgical instrument according to claim 6, wherein said first
surface is concave.

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10. An ultrasonic surgical instrument according to claim 7, wherein said first surface is concave.
11. An ultrasonic surgical instrument according to claim 8, wherein said
5 second surface is convex.
12. An ultrasonic surgical instrument according to claim 9, wherein said second surface is convex.
- 10 13. An ultrasonic surgical instrument according to claim 10, wherein said second surface is convex.
14. A method of balancing an ultrasonic blade comprising the steps of:
A) selecting a maximum acceptable level of undesirable blade excursion;
15 B) adding a functional asymmetry to said blade by removing an amount of material from a portion of said blade along a length of said blade, wherein said length of said functional asymmetry satisfies said acceptable level of undesirable excursion identified in step A.
- 20 15. A method of balancing an ultrasonic blade according to claim 14, wherein said maximum acceptable level of undesirable blade excursion in step A is 15 % normalized excursion.
16. A method of balancing an ultrasonic blade according to claim 14, wherein
25 said maximum acceptable level of undesirable blade excursion in step A is 10 % normalized excursion.
17. A method of balancing an ultrasonic blade according to claim 14, wherein
30 said maximum acceptable level of undesirable blade excursion in step A is 5 % normalized excursion.

18. A method of balancing an ultrasonic blade according to claim 14, wherein in step B, said functional asymmetry is a narrow edge, wherein said narrow edge is defined by the intersection of a first surface and a second surface, wherein said first surface extends proximally into said blade from a distal end of said blade toward a proximal end of said blade, defining said length of said functional asymmetry;
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- wherein said length of said functional asymmetry balances said blade such that a secondary tip excursion of said blade is less than 15 % of the primary tip excursion of said blade.

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